

CLAIMS

1. A non-contact position sensor comprising:

a magnetic circuit comprising at least one magnet and a magnetically

5 continuous magnetic body;

at least one magnetic sensor element disposed to said magnetic circuit;

and

- an object to be detected, said object positioned in said magnetic circuit.

10 2. The non-contact position sensor according to claim 1, wherein said magnetic body includes a discontinued portion, and said object to be detected is positioned in any one of said discontinued portion, and between said discontinued portion and said magnet.

15 3. The non-contact position sensor according to claim 1, wherein

said magnetic body comprises two magnetic bodies, each having generally an L-shaped tip end, and

said magnetic sensor element is disposed to the tip end of at least one of said two magnetic bodies.

20 4. The non-contact position sensor according to claim 1, wherein

said magnetic body has one magnetic pole of said magnet disposed to generally a center portion thereof, said magnetic body has L-shaped tip ends at both ends thereof, and

25 said object to be detected is disposed in a position among said one magnetic pole, an opposite pole of said magnet and the tip ends of said magnetic body.

30 5. The non-contact position sensor according to claim 1, wherein

said magnetic circuit comprises a magnetic body of magnetically closed circuit and two magnets disposed to an inside of said magnetic body of closed circuit,

said magnetic sensor element is disposed to the inside of said magnetic body of closed circuit,

35 and said object to be detected is positioned between said two magnets.

6. The non-contact position sensor according to any one of claim 1 to claim 5, wherein said object to be detected has a cross section of any one of a sectorial shape, semicircular shape and I shape.

5 7. The non-contact position sensor according to any one of claim 1 to claim 4, wherein a tip end of said magnetic body is slanted with respect to an axis connecting an N-pole and an S-pole of said magnet.

10 8. The non-contact position sensor according to claim 5, wherein said magnetic body has a portion having a thickness smaller than the other portion, and

15 said magnetic sensor element is disposed to said portion of smaller thickness.

19 9. The non-contact position sensor according to claim 5, wherein the portion of said magnetic body where said magnetic sensor element is disposed has a stepped level of different plane from the other portion.

20 10. The non-contact position sensor according to claim 5, wherein a lateral width of each said two magnets is generally equal to a diameter of said object to be detected.

25 11. The non-contact position sensor according to claim 1, wherein said magnetic circuit comprising a U-shaped first magnetic body, a U-shaped second magnetic body, and two magnets,

20 said two magnets are disposed between said two U-shaped magnetic bodies arranged vertically, and

25 said magnetic sensor element is disposed to a generally center portion between said two U-shaped magnetic bodies.

30 12. The non-contact position sensor according to claim 11, wherein the portion of each said U-shaped magnetic bodies where said magnetic sensor element is disposed has a stepped level of different plane from the other portion.

35 13. The non-contact position sensor according to claim 12, wherein the portions of said U-shaped first and second magnetic bodies where said magnetic

sensor element is disposed are in contact to each other via said magnetic sensor element.

14. The non-contact position sensor according to claim 11, wherein at
5 least one of said two U-shaped magnetic bodies has a shape that comes in contact
with an external shape of said object to be detected.

10 15. The non-contact position sensor according to claim 11, wherein
each of said two U-shaped magnetic bodies has stepped planes, and
said two magnets confront each other at different planes.

15 16. The non-contact position sensor according to claim 11, wherein
each of said two U-shaped magnetic bodies further has a magnet
supporting section, and
said two magnets confront each other at different planes.

20 17. The non-contact position sensor according to claim 1, wherein
said magnetic circuit comprising a U-shaped first magnetic body, a U-
shaped second magnetic body of a greater size than said first magnetic body, and
two magnets,

said two magnets are disposed between said two U-shaped magnetic
bodies, and

said magnetic sensor element is disposed within a U-shaped space of
said U-shaped first magnetic body.

25 18. The non-contact position sensor according to claim 17, wherein said
U-shaped first magnetic body and said U-shaped second magnetic body are
disposed to a same plane.

30 19. The non-contact position sensor according to claim 17, wherein said
U-shaped first magnetic body and said U-shaped second magnetic body are
disposed generally perpendicularly with respect to each other.

35 20. The non-contact position sensor according to claim 19, wherein said
U-shaped second magnetic body has an aperture formed in generally the center
thereof for receiving an insertion of said object to be detected.

21. The non-contact position sensor according to claim 19, wherein said U-shaped second magnetic body comprises two parts, and

5 contacting sides of said two parts form a portion for receiving an insertion of said object to be detected.

22. The non-contact position sensor according to claim 1, wherein said magnetic circuit comprising a U-shaped first magnetic body, a U-shaped second magnetic body, and two magnets,

10 said two magnets are disposed between said U-shaped first and second magnetic bodies arranged vertically,

 said magnetic sensor element is disposed to a generally center portion between said U-shaped first and second magnetic bodies, and

15 said object to be detected is disposed in a linearly movable manner between both ends of said U-shaped first magnetic body and both ends of said U-shaped second magnetic body.

23. The non-contact position sensor according to claim 22, wherein one side arm of said U-shaped first magnetic body has a width generally

20 equal to a width of one side arm of said U-shaped second magnetic body,

 another side arm of said U-shaped first magnetic body has a width generally equal to a width of another side arm of said U-shaped second magnetic body, and

25 a detectable distance of said object to be detected equals to a distance derived by subtracting a length of a detective section of said object from the sum of the width of said one side arm, the width of said another side arm, and a space between said one side arm and said another side arm.

24. The non-contact position sensor according to claim 23, wherein the 30 length of said detective section is longer than any of the width of said one side arm and the width of said another side arm.

25. The non-contact position sensor according to claim 22, wherein a portion of any of said U-shaped first and second magnetic bodies where said 35 magnetic sensor element is disposed has a stepped level of different plane from the other portion of said U-shaped first and second magnetic bodies.

26. The non-contact position sensor according to claim 25, wherein the portions of said U-shaped first and second magnetic bodies where said magnetic sensor element is disposed are in contact to each other via said magnetic sensor element.

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20100-335550